

Bombay.—Layout and foundation drawings for controlling 110 kV. and 50 kV. oil-circuit breakers for second 110/50 kV. transformer-bank.

Henderson.—Layout and foundation details for additional 50 kV. switchgear for controlling North Auckland line and for 50 kV. oil-circuit breakers for main transformer-banks.

General.—The plotting of operating data for the various systems including lake-level and river-flow data, maximum loads and weekly output for generating-stations, maximum demands and consumption of energy for local supply authorities and other major consumers was continued throughout the year.

Specifications were prepared for electrical equipment for the Mechanical Branch and other Departments, including the following equipment :—

Diesel generating-sets for construction camps. 250 kW. motor-generator set for Devonport Naval Base. Diesel generating-sets, automatic switchgear, and storage batteries for lighthouse service.

Ornamental lighting installation for Rotorua.

Motors for irrigation pumping-sets.

The use of motor-car type batteries, operated on the floating system for switch operation, is being extended to most of the stations, rectifiers of the copper-oxide type being used to trickle-charge the battery and supply the normal D.C. load. Several of these rectifiers have been made up by New Zealand firms.

Designs have been prepared for single and communal garages for rental to members of the operating staff for private motor-cars.

A considerable amount of study has been given to current literature on concrete construction with a view to improving the standard, firstly, by more careful study of aggregate grading and control of the process of manufacture, and, secondly, by improved methods of handling, compacting in the forms by the use of vibratory placing machines, and curing.

Study has also been given to the use of electric-arc welding for major steel structures ; and for joining and building up concrete reinforcement ; also to the adoption of rigid frames for power-station and substation buildings for greater efficiency in the resistance to earthquake effects.

Transmission-lines.

West Coast (66 kV. lines)—

(a) Lake Coleridge to Arahura on West Coast via Arthur's Pass and Otira : Double circuit.

(b) Arahura to Dobson : Single circuit.

For above lines several types of wood-pole structures have been designed and detailed, both with and without guys. Charts were prepared for use in the field when locating the supports, also stringing charts for the conductors. Steel towers were necessary for the Arthur's Pass—Otira section, and drawings and specifications were made for the ordering of these structures. Route plans were prepared showing the location of the towers. Sundry foundation drawings, and location of supports at river crossings have been dealt with.

Dunedin-Gore (110 kV. line, single circuit).—Drawings of the wood-pole structures have been prepared, and charts for their location in the field. The Clutha River will be crossed at Clydevale and a preliminary layout of the crossing, including height and type of supports, and height and tension of the conductors, has been made.

General.—Between Ashburton and Timaru the existing lines cross the Rangitata River, being supported on 66 kV. steel towers purchased in 1922. Subsequent developments have made it necessary to raise the voltage in the near future, and the structural alterations to the towers for this purpose have been investigated.

Two 11 kV. feeders from Khandallah Substation for electrical supply to the New Zealand Railways at Ngahauranga and Khandallah have been constructed. Plans have been checked, and title searches made.

The construction of the North Auckland 50 kV. line as far as Maungatapere was completed early in 1937. Stringing charts and data were supplied for use in the field.

In association with several other Government Departments some work has been done on a standard specification for New South Wales timber poles, with a view to a more uniform inspection.

The possibility of making concrete poles to replace the larger timber poles upwards of 50 ft. or more in length has been investigated. A 50 ft. pole was designed and four experimental poles made. These were tested to destruction in various ways to ascertain their behaviour under the different loadings occurring in service and during construction of transmission-lines. The poles made demonstrated their ability to carry the loads for which they were designed, but on the score of high cost and excessive weight, cannot be recommended for general purposes. Useful data was obtained for any future work in this direction.

Several designs of concrete poles from outside sources have been examined with a view to approval by the Department.

Various applications from Electric-power Boards for approval of new lines have been dealt with, checks being required on the strength of supports, and conductor sags and tensions, to ascertain their compliance with the Electric Supply Regulations.

(B) Hydraulic Section.

Investigation of Power Resources.

During the year further surveys have been made at Lakes Tekapo, Pukaki, and Ohau with a view to determining the amount of land and buildings that would be affected if a control dam were built at the outlet of each lake.

A report is in preparation concerning the future of the South Island system of supply, the amount of stored water required to regulate supply, and how much it is advisable or necessary to provide at each place. A study is also being made of the alternative scheme of diverting Lake Tekapo through the Two Thumb Range and developing a high head scheme into the Opihi a few miles above Fairlie.